England, France, Italy, Spain, Portugal, and Russia. There was, however, increased prevalence in Egypt and Algeria, and an epidemic with over 2,100 deaths at Rio de Janeiro, while 957 cases with 171 deaths occurred between January 1st and May 15th, 1926, at Los Angeles.

Various Infectious Diseases.

During 1926 were notified 2,739 cases of enteric (including paratyphoid fever) as compared with 2,779 in the previous year, 4,121 in 1924, and 3,211 in 1923. Scarlet fever cases fell to 81,672 from 91,362 in 1925. Sir George Newman expresses the hope that the early administration of scarlatinal antitoxin serum in suitable cases will reduce materially the period of detention in hospital of these patients. There were 51,069 cases of diphtheria notified in England and Wales during 1926, with 2,994 deaths, as compared with 47,720 cases in 1925, and 41,980 in 1924. The warning is given that immunization is too often postponed unduly until an epidemic occurs; full protection cannot then be assured, owing to the fact that the condition of immunity requires at least two or three months for its development. The diphtheria death rate increased slightly from 0.071 per 1,000 population in 1925 to 0.077 for the year under review. Until the end of 1926 there was no evidence of influenza being of particular importance statistically, but in the first week of January, 1927, an epidemic began in London and moved slowly northwards. Sir George Newman gives an account of this epidemic, and concludes that the recrudescence of influenza was rather more serious than the outbreak in 1924, but less so than that of 1922. In age distribution and general type its features were those of the prepandemic period rather than of 1918-19. There was an associated increase in pneumonic notifications. Two locally contracted cases of bubonic plague occurred in Liverpool in 1926, but the cause was not traced. One case of typhus of unknown origin was detected in Sunderland.

Acute Poliomyelitis.

Special consideration is given to acute poliomyelitis in view of its increased prevalence during 1926, when 1,159 cases were reported with 176 deaths. The outbreaks since 1897 in various parts of the country are tabulated. In 1926 the disease began its epidemic phase in the middle of July, and continued till the end of the year, extending through the mild winter including the first two months of 1927. The disease was particularly prevalent in Essex, Kent, and the Midlands, but the cases were not very numerous in the most populous areas, and in London the incidence was relatively slight. The infection usually involved small groups of population in rural districts. Details are given of the outbreaks in Leicestershire, Essex, and Kent. It is concluded that there is at present no evidence to incriminate the milk supply in this connexion. No social predilections were shown by the disease, and it appears that the home conditions were not so concerned in its spread as they are in other contagions. Clear evidence of contact transmission was obtained in two outbreaks, and it seems to be established that the infection may be conveyed by persons suffering from acute typical attacks, or from the mild and atypical forms; it may also be spread by healthy persons who have come into contact with the disease without being affected by it, or by chronic carriers who have apparently recovered fully. The infectivity in acute cases is greatest during the early stages of the malady. The possibility of transmission by insects, food, dust, or sewage seems to be remote, and human contact remains the chief, if not the sole, probable means of spread. The general evidence points to an incubation period of four to five days, though shorter and also much longer intervals have been recorded. Details are given of the clinical manifestations, the diagnostic criteria, and the prevention and treatment of the disease. Sir George Newman concludes that infection is probably widespread in a community during an epidemic, but that only a small proportion of susceptibles are attacked. He emphasizes the importance of early diagnosis, and of providing institutions equipped to give special treatment with a view to preventing muscular weakness or permanent deformity.

(*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

ANNUAL MEETING IN LEEDS.

THE annual meeting of the British Association for the Advancement of Science, which was founded ninety-seven years ago, began in Leeds last week, when Sir Arthur Keith, M.D., F.R.S., Conservator of the Museum of the Royal College of Surgeons of England, succeeded the Prince of Wales in the presidential chair. The Prince, who was still in Canada at the time of the meeting, sent a message in which he recalled that in his address at Oxford last year he had dealt with the relations between science and the State. The choice of this topic had, he thought, been justified by the proceedings of the Imperial and Colonial conferences, which both laid emphasis upon the value of scientific research in relation to imperial development, and both set up special committees on research. Such events put it beyond doubt that one of the main objects of the British Association was in process of achievement—namely, that of "obtaining more general attention for the objects of science." The Prince then referred to the splendid generosity of Sir Alfred Yarrow in making a gift of £10,000 for the general purposes of the Association, to be expended in the course of twenty years. In conclusion, the Prince said that he could whole-heartedly congratulate the Association on its choice of his successor, for Sir Arthur Keith's name stood very high in the science of man's origin and early biological history.

Before Sir Arthur Keith began his address he read out a letter of thanks to the Prince of Wales, in which, also, stress was laid on the inspiring message the Prince had given at Oxford to the Association, and through it to men of science throughout the Empire. His appeal had already borne fruit. Closer union between men of science overseas and their colleagues at home in their endeavour to solve problems of imperial concern was within sight.

The President then delivered his address, which is printed at page 439. In acknowledging at its conclusion a vote of thanks, which was given with great enthusiasm, Sir Arthur Keith announced that the Council of the British Association was considering the advisability of purchasing for the nation the home and surroundings in which Charles Darwin worked, and which were thus the cradle of ideas that had transformed the outlook of man.

THE SECTIONS.

The British Association publishes at the time of its annual meeting a *Journal of Scientific Transactions* which not only serves as an agenda paper of the various meetings, but also gives concise abstracts of many of the papers. The publication is of interest also as affording some idea of the all-embracing scope of science. From the nucleus of the earth to infinite space there is hardly a phenomenon of the universe that escapes its scrutiny. The appeal is, naturally, to the man of science, but the ordinary citizen, in these strenuous and somewhat perilous times, cannot be indifferent to such subjects as, for example, mental stress and the psychology of accidents.

HUMAN PHYSIOLOGY: ITS STUDY AND TEACHING.

Taking for the subject of his presidential address the development of human physiology, Dr. C. G. Douglas, F.R.S. (Oxford), sought to place before the members of the Section of Physiology a picture of the real task of physiology—namely, the study of the phenomena which characterize normal life as shown in the individual organism. Bearing this definition in mind, it was clear that the very great advance in knowledge which had been made in the last fifty years did but take us to the threshold of the subject; investigation had been analytical, the organism had been treated as consisting of more or less independent systems—circulatory, respiratory, and other—which were separately investigated in detachment, as it were, from the individual organism and studied apart from their normal setting. Moreover, the discoveries, with some exceptions, had been made in animals by experimental methods, and often under the influence of anaesthetics—

that is to say, not under normal conditions, but under the pathological conditions of traumatism and intoxication. Invaluable as the information reaped from these researches had been, it did not meet the demands of the definition, nor give the full answer that we required. In a few instances the experimental procedure had been of a nature not to interfere with the regular bodily functions of the animal; this was so, for example, in Pavlov's researches on the digestive juices and those of Rubner on nutrition and energy liberation. Apart from these exceptional instances, however, it could hardly be denied that the traditional methods had their limitations, and Dr. Douglas contended that in the study of normal physiology man himself was in many instances a far more advantageous subject for investigation than were the lower animals. In support of this contention he adduced several instances in which valuable information had been reaped from investigations on the human subject, and he claimed that for gaining any adequate conception of what is really implied by life, the method could be replaced by no other.

The history of the development of our ideas about respiration afforded, he said, a striking example of the value of human physiology. The researches of Haldane and Priestley by this method had shown that the activity of the respiratory centre depended on its sensitiveness to the concentration of CO_2 in the blood—a trifling rise causing hyperpnoea, a trifling fall causing reduction or cessation of breathing. It became evident that the activity of the respiratory centre was proportional to the mass of CO_2 produced in the body and carried to the lungs, and this in turn implied that the quantitative correlation of the ventilation of the lungs with changes of metabolism in the body as a whole was ensured by chemical means. From this work we gained our first insight into the amazing delicacy of true chemical correlation within the organism. It was subsequently recognized that the respiratory centre was sensitive not to CO_2 as such, but to changes in the H-ion concentration of the blood, and that lactic acid accumulation resulting from muscular activity had to be taken into account. Having grasped the fact that breathing was automatically adjusted to tissue metabolism, it became obvious that the delicate adjustment of the breathing in conformity with the various changes in the activity of the different tissues and organs would be valueless without an equally delicate co-ordination of the circulation, since on this depended the transport of gases between the tissues and the lungs.

To ascertain the full facts of the regulation of the circulation and its adaptation to the varying needs of the body was a more difficult problem than the regulation of breathing; but a beginning had been made. Methods had been developed for determining the circulation rate in man, for measuring the variations in the amount of blood expelled from the heart under different conditions of bodily activity, the extent of the changes in gas content of the venous blood entering the lungs, and the relative part played by alterations in the pulse rate and in the systolic discharge at each beat. These and other researches referred to by the lecturer showed something of the part that human physiology had already played in the study of vital phenomena. The evidence of balanced interaction of the functions of the different organs with the preservation of the functional integrity of the whole, which was so convincingly brought home to us in experiments on the human subject, had made us appreciate the fact that for the comprehension of life it was the normal human organism which should be regarded as our physiological unit.

Finally Dr. Douglas expressed the opinion that the teaching of physiology would be more satisfactory if human physiology occupied a more prominent position, not so much as regards advanced teaching, but in the course taken up by the majority of students who had a medical career in view. So far as elementary practical physiology was concerned, as distinct from biochemistry, reliance was still placed largely upon an experimental treatment of the rudimentary phenomena exhibited by amphibian muscle and nerve, and there seemed little doubt that a serious attempt to incorporate, even in elementary courses, experiments in human physiology would be amply justified in its results.

MENTAL DISSOCIATION.

Dr. WILLIAM BROWN, the President of the Section of Psychology, gave an address on mental unity and mental dissociation. Its substance may be stated as follows: Considered in its most general aspect, man's mind was a unity—one, and indivisible. So too with regard to its function; in the broadest sense mind had but one fundamental function—a purposeful striving toward a definite equilibrium, the colour of which was satisfaction. But, like all other things, mind had undergone development from the simple to the complex; in its varied experience it had employed partial activities to aid and favour the attainment of its one fundamental objective, and its structure had been moulded, without being divided, to subserve these partial ends. Mind, therefore, although one, was not homogeneous, but exhibited structure, and presented itself as an association of partial activities developed by varied moulding of a single originally homogeneous substratum. As the mind could, by association, combine partial activities to its advantage, so also it could reject partial activities which, in changing circumstances, opposed its fundamental aim. This dissociation was a normal, not a pathological, process of the mind—a process, not of annihilation, for the mind could not obliterate the structural modification upon which the partial activity had depended, but one of reduction to mere potentiality, and degradation from participation in the practical affairs of life. Since the structural modification remained, circumstances might revive the potential partial activity into actuality. It might be supposed that if a complex group of such potential activities was suddenly brought into play, and if at the same time the corresponding normal, but contrasting, group was degraded, the individual would exhibit, not a division of the mind, but a new personality. Instances of alternating personality of this kind were well known, and it was in such cases that the pathology of dissociation could be detected. It was not that dissociation was in itself an abnormal process—the contrary was the case—but that in these instances it was incomplete; a tendency which was repressed was, as it were, rejected and accepted at the same time—rejected by clear consciousness, but still clung to by the mind.

Dissociation as a normal process might, however, be abnormal in its incidence, just as the contraction of the arterioles, although a useful function, might be inconvenient if untimely. The dissociation, instead of suppressing an undesirable activity, might affect a part of the normal mental processes and put out of action an essential element in the normal working of the mind. Cases of shell shock afforded examples of this, a forgetfulness of the events immediately succeeding the catastrophe indicating the loss of a partial mental activity. The unity of the mind was not destroyed, but its adaptation to the changing circumstances of existence was impaired; the physical phenomena associated with the shock, such as tremors, mutism and paralysis, which would pass away under the influence of an intact mind, were severed from their psychical counterpart—fear—and became fixed. While treating cases of shell shock in France, Dr. Brown found that a large proportion showed a more or less extensive amnesia for events that had occurred immediately after the explosion. These patients were easily hypnotized, and under a light hypnosis the lost memories could easily be restored; and he found that if at the same time the terrifying emotion were also recalled, the accompanying physical symptoms disappeared spontaneously. This result he explained in terms of a theory of reassociation (BRITISH MEDICAL JOURNAL, June 14th, 1919); by re-arousing the whole of the lost experience in all its emotional vividness the physical manifestations became linked up with their psychical counterpart, the mind became resynthesized, and the physical symptoms, coming once more under the sway of the entire mind, could disappear.

LIGATURE OF THE VAS DEFERENS.

In the Section of Zoology the committee (Dr. F. A. E. Crew, Mr. J. T. Cunningham, and Professor J. S. Huxley) for the experimental investigation of the effects of vaso-

ligation, cryptorchidism, grafting, etc., on the seminal tubules and interstitial tissue of the testes of mammals, presented a further report. The right vas deferens was ligatured, in the cat, in two places, and a piece between the ligatures cut out. The animal was killed 104 days after the operation. The end of the vas next to the operated testis was found to be closed and the spermatic blood vessels uninjured. Abundant active sperms were obtained from the epididymis of the non-operated testis, and the operated testis showed perfectly normal spermatogenesis. The epididymis of the operated side was distended with semen, its diameter being twice the normal. Experiments on ligation of the vasa efferentia were carried out on the rat. They showed that closure of the lumina of the vasa efferentia caused complete disorganization of the seminal epithelium in six days. As the operation involved no interference with the circulation of blood in the testis, it was evident that the effect was to be attributed to increase of pressure within the tubules. It followed, therefore, that if the vas deferens only were ligatured the absence of injurious effect was due to the fact that the great space contained in the long coiled tube of the epididymis prevented this increase of pressure in the seminal tubules; the epididymis acted as a reservoir for the semen and became greatly distended in consequence.

The conclusion drawn was that when the distension and pressure increased to a certain point within the epididymis, absorption of semen was increased, an equilibrium was reached, and no further rise of pressure occurred. In one experiment, in the rat, the membrane through which the vasa efferentia pass was ligatured on the left side, and the right testis was detached from the scrotum and fixed to the abdominal wall by a ligature passing through the gubernaculum. The animal was killed after sixteen days, when the right testis was found to be atrophied, being only about half the normal size, and its seminal epithelium was completely disorganized. The left testis was functional and the ligature loose.

Mental Stress and the Psychology of Accidents.

In a paper read to the Section of Physiology Dr. R. J. S. McDowall, Professor of Physiology, King's College, London, maintained that the general effect of mental stress was associated with increased sympathetic activity; there is an increased rate of the heart and vasomotor tone, which together bring about a great elevation of blood pressure. Further, there is definite evidence that alimentary activity in general is diminished, as shown in the reduction in salivary and gastric secretion and the marked delay in the emptying of the stomach. Such conditions may, Professor McDowall suggests, be largely responsible for many alimentary ailments and, in part, also for undue strain on the circulation. With regard to accident causation, Mr. F. Farmer, in a paper read to the Section of Psychology, said that it had been shown that the distribution of industrial accidents among individuals exposed to the same risk was not such as can be explained by chance. The typical curve of accident distribution exhibited special features, which seemed to point to the conclusion that each person had a given degree of accident proneness which would determine to a large extent the number of accidents he would sustain in a given period of exposure. This conclusion was reached as the result of certain sensory-motor tests of the rapidity and accuracy of visual, auditory, and tactual reactions.

First Recorded Case of Colour-Blindness.

In the same Section Dr. Edridge-Green claimed that the celebrated physicist Robert Boyle was the first to record a case of colour-blindness. Two cases came under Boyle's notice, concerning one of which, a girl of 18, he writes, in 1688, that

"she can distinguish some Colours, as Black and White, but is not able to distinguish others, especially Red and Green: And when I brought her a Bag of a fine and glossie Red, with Tufts of Sky-Coloured Silk; she looked attentively upon it, but told me, that to her it did not seem Red, but of another Colour, which one would guess by her Description to be a Dark or Dirty one: and the Tufts of Silk that were finely Colour'd, she took in her Hand, and told me they seemed to be a Light-colour, but could not tell me which; only she compar'd it to the Colour of the Silken Stuff of the Lac'd Petticoat of a Lady that brought her to me; and indeed the Blews were very much alike. And when I asked her, whether in the Evenings, when she went abroad to walk in the Fields, which she much delighted to do, the Meadows did not appear to her Cloathed in Green? She told me they did not, but seemed to be of an odd Darkish colour; and added, that when she had a mind to gather Violets, tho' she kneel'd in that Place where they grew, she was not able to distinguish them by the Colour from the neighbouring Grass, but only by the Shape or by feeling them."

Some years previously this girl had lost her sight, which gradually returned, with the exception of the colour sense.

Amoeboid Movements.

Mr. C. F. A. Pantin contributed to the Section of Zoology some observations on amoeboid movements. As these were, he said, independent of permanently differentiated contractile structures, the theory had been advanced that they were due to a lowering of the surface tension at one spot. Microscopical dissection and other evidence showed that this view was untenable and that the movement was associated with the ready changes of state of the protoplasm from a fluid "sol" to a contractile "gel" and vice versa. The changes were easily observed in the Limax type of amoeba, in which each particle of protoplasm underwent a more or less rhythmic change of state from sol to gel.

The Fertility of the Sea.

Mr. H. W. Hervey reported to the same Section some ingenious observations on the fertility of the sea. Its animal life was, he pointed out, ultimately dependent on minute plants, which in their turn were dependent on the supply of phosphates and nitrates in the water. Such salts were in general abundant in the deep water of the open ocean, but absent from the surface, where alone the presence of light rendered vegetable life possible. Where, however, currents brought the deep water to the surface, there minute organisms were abundant, giving the water a greenish hue, contrasting with the deep blue of the barren areas of the ocean. Around our coasts the cooling of the surface in winter caused mixing with the warmer layers below, and, plant life being scarce at that season, the salts arising from the decay of dead organisms accumulated. In spring a rich outburst of diatoms utilized these salts, while in late summer a second outburst of plant life occurred, utilizing the salts regenerated from the corpses of the spring and early summer growth.

Head Hunters.

In the Section of Anthropology among several papers of interest was one by Dr. J. P. Hutton on the savage custom of head hunting. A recent authoritative work on Borneo traces the custom to a desire for human hair as an ornament or for human beings to accompany the dead in the next world. Dr. Hutton satisfied himself that in Assam it had a different significance, for it appeared to be connected with a belief in the fertilizing powers of the dead—for the soil, for stock, and for the human population. To assist these fertilizing powers, phallic stones were erected as symbolic abiding-places for the soul, and similar stones were intimately connected with head hunting.

Education of Uncivilized Races.

In the Educational Section Mr. Rivers Smith made some interesting observations on the educational policy which appears to have been officially adopted for tropical Africa. The best results, he considered, were to be looked for by the adaptation to the demands of civilized societies of what can be retained of native social systems, and by endeavouring to promote the growth of the new order through a natural process of evolution, rather than by an undue insistence on Western systems. Care, he urged, should be exercised not to destroy a good African by the inoculation of ideas and tastes which could not find expression in an African community. The aim should be to produce a new but finer conception of the African rather than a spurious imitation of the European.